ONONDAGA LAKE

Superfund Review

September 1998 *A publication of Atlantic States Legal Foundation, Inc.* Issue No. 2

FILE COPY

Cleaning Up the Lake: What Will it Take?

Decades of scarcely controlled pollution and other abuses have earned Onondaga Lake the rather dubious distinction as "America's Most Polluted Lake." While some people may view the lake as a cesspool beyond redemption, it is in fact a natural resource (even in its current degraded condition) with significant potential for bringing substantial benefits, economic and otherwise, to the local community. An informal poll conducted at the recent FOCUS Syracuse Fair indicated that cleaning up the lake remains a top priority in the community.

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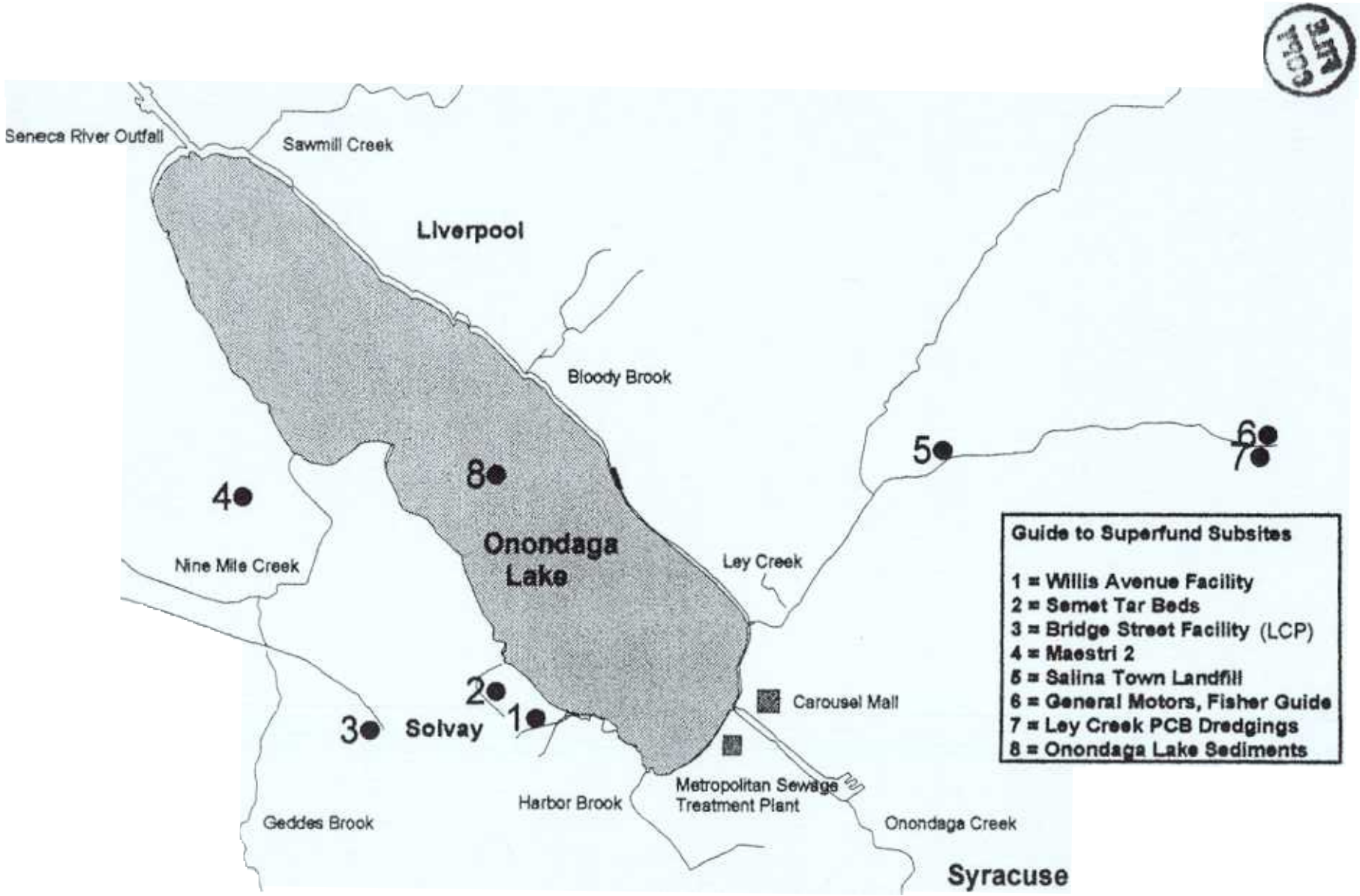
Seneca River Outfall
Sawmill Creek
Liverpool
Bloody Brook
Onondaga Lake
Nine Mile Creek
Ley Creek
Carousel Mall
Solvay
Metropolitan Sewage Treatment Plant
Harbor Brook
Geddes Brook
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Syracuse
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Cleaning Up Onondaga Lake: What Will It Take?

(Continued from Page 1)

Although thousands of people make use of Onondaga Lake and its adjacent parkland as a recreational site, this represents only a minimal exploitation of the lake's possibilities. A clean lake would significantly enhance its potential as a recreational and economic resource. It is worth noting, for example, that Fortune 500 companies accord significant weight to local recreation potential when they consider cities in which to locate their headquarters.

For the lake's potential to be realized, it will be necessary to significantly reduce current levels of pollution. Because this process is largely in the hands of government officials (elected and appointed), public participation (or its absence) will play a crucial role in determining the pace at which clean-up will proceed.

Many citizens are confused about what "clean-up" means, and when it will happen. This edition of the Onondaga Lake Superfund Review, the second in a series of five, will attempt to clarify these issues.

The lake, which has been degraded as a result of various activities, has been profoundly impacted by industrial contamination and municipal pollution. ***Industrial contamination*** consists of a variety of chemicals accumulated in the lake's sediments and in nearby toxic waste dumps that were left behind from over a century of industrial activity in the Syracuse. It is this contamination which led the U.S. Environmental Protection Agency (EPA) in December of 1994 to add Onondaga Lake to the federal Superfund list of the most contaminated hazardous waste sites in the country.

Municipal pollution results from the discharge of *treated* wastewater from the county's sewage treatment plant, and of *untreated* wastewater from the county's combined sewer system. High levels of bacteria, ammonia, and phosphorus, deprive the lake of oxygen in the summer, cause heavy growths of algae, cloud the water, kill (or drive away) fish, and make the water unfit for swimming.

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Industrial Contamination

Over the past century, local industries have discharged enormous quantities of wastes into Onondaga Lake. The principal industrial polluter was a large chemical plant, originally operated by the Solvay Process Company (now Allied-Signal, Inc.). This plant, located on the southwest shore of the lake, manufactured over 30 chemicals, most notably soda ash (Na_2CO_3), a substance used extensively in glass production. The company produced soda ash employing the so-called Solvay Process, combining locally mined salt

Continued on next page

Municipal Pollution

As difficult as it may be to conceive of today, Onondaga Lake was once a valued economic resource for the city of Syracuse. At the turn of the century, it was home to a thriving resort industry, attracting tourists from throughout the state. The lake also supported a lucrative fishery, which included the prized Onondaga Lake whitefish. However, this began to change in the late 19th century when the lake became a receptacle for both urban and industrial wastes. In 1892, Onondaga County banned privies as a method for

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The Bridge Street subsite remains a major source of mercury to the lake.

(NaCl) and limestone ($CaCO_3$). Unfortunately, the Solvay Process produces large quantities of a white, chalky powder composed of calcium chloride, sodium chloride, and other relatively inert substances. These wastes were discarded in large waste beds covering over 1,500 acres of land along the lakefront and southwest of the New York State fairgrounds.

The Solvay waste has dramatically increased the lake's salinity, but it is otherwise relatively harmless. In contrast, other waste-products discharged by the Allied facility are quite toxic. Chief among these is **mercury**, a byproduct of the company's two chlorine-manufacturing plants. This toxic metal is found in the sediments on the lake bottom at concentrations over 1000 times greater than background levels.

Other toxic substances which leaked or were dumped into the lake by Allied include:

- **benzene, toluene, xylene** (solvents)
- **chlorinated benzenes** (used to make mothballs, for example)
- **polyaromatic hydrocarbons** (a component of coal.)

Contaminants which enter the food chain, such as hexachlorobenzene and mercury, concentrate in fish, birds, and humans through the process of bioaccumulation. More information on these contaminants and their health effects will be available in the third and fourth newsletters in this series (see p.11).

Superfund[1]

In 1989, the New York State Attorney General sued Allied and Linden Chemicals & Plastics (LCP) for the costs of damage to natural resources resulting from industrial contamination of the lake. In 1992, Allied signed a legal order in which it agreed to:

- Finance and carry out a $7 million study of the lake. The study analyzed a wide range of environmental samples, including lake sediments, fish tissues, soils, groundwater, and water from the lake and tributaries.
- Conduct a number of related investigations, such as studies to determine how mercury is distributed in the environment.
- Develop a set of computerized water quality models which simulate the movement of water, nutrients and chemicals in the lake system. Several of these models have been completed, while others are still being evaluated.

In December 1994, the US EPA added Onondaga Lake to the federal Superfund's National Priorities List, a list of the most contaminated hazardous waste sites in the country. Onondaga may be the only lake to

[1] For a more detailed discussion of the Superfund program, see *Onondaga Lake Superfund Review* Issue No. 1.

enjoy that ignoble distinction. This designation makes Allied and any other so-called "Potentially Responsible Parties" (PRPs) legally liable for the costs of cleaning up their contamination.

Currently, the Onondaga Lake Superfund Site is made up of eight subsites (see Table 1), including the lake sediments and seven nearby waste sites which contribute toxic contaminants to the lake. Contaminated runoff from some of these sites flows into local streams which then carry their toxic load to the lake. Contamination from other sites may also seep into groundwater, which also flows into the lake.

Superfund sites go through a series of procedural steps which ultimately lead to some type of remediation. These steps include:

- Preliminary assessment.
- Detailed investigation ("remedial investigation").
- Analysis of possible clean-up strategies ("feasibility study").
- Selection of a preferred strategy ("proposed remedial action plan").
- Public comment and Record of Decision.
- Implementation of the plan, including design, construction, and operation.

TABLE 1. ONONDAGA LAKE SUPERFUND SUBSITES*

SUBSITE NAME	POLLUTANTS OF CONCERN	POTENTIALLY RESPONSIBLE PARTIES (known)
1. Willis Ave. facility (Village of Solvay)	Chlorinated benzenes, mercury, chloro-dioxins	Allied-Signal
2. Semet Tar Beds (Town of Geddes)	Benzene, toluene, xylene naphthalene, diphenyl ethanes	Allied-Signal
3. Bridge St. Chlor-alkali plant (LCP) (Village of Solvay)	Mercury	Allied-Signal, LCP
4. Maestri 2 site (Lakeland)	Ignitable wastes Caustic mill scale	Val's Dodge, John B. Maestri, Crucible Specialty Metals, Coltech, Inc.
5. Salina Town landfill (Town of Salina)	PCBs	Town of Salina
6. General Motors Fisher Guide plant (Town of Salina)	PCBs	General Motors
7. Ley Creek dredge spoils (Town of Salina)	PCBs	General Motors
8. Onondaga Lake sediments	All of the above	Allied-Signal, General Motors, LCP, Town of Salina

**Current as of August 1998. Sites may be added or eliminated as additional information becomes available.*

The remediation process is a slow one. It is not unusual for the whole clean-up process to take in excess of ten years, especially for large, complex sites like Onondaga Lake. Public involvement is crucial to preventing the process from dragging on unnecessarily.

The options for addressing contamination at a subsite range from "No Action" (do nothing) to complete removal and/or treatment of the contaminated soils, groundwater, sediments, etc. Frequently, PRPs seal waste materials in place or put them into an on-site landfill as a cost-saving measure. Thus, a "remediated" site can still contain substantial quantities of toxic waste, which can pose a continuing threat to the surrounding community.

Generally, the party or parties deemed responsible pay for all steps of the process, starting with the investigation, and ending with the full-scale remediation. If the responsible parties are uncooperative, the EPA (or state) can sue them to compel clean-up, or can undertake clean-up using Federal funds and recover up to three times the cost in court. Superfund dollars come out of a special trust fund which is financed by taxes on chemicals. The bottom line is that taxpayers are *not* liable for Superfund clean-up costs.

Clean-up Actions

While final clean-up actions have not yet taken place for any of the Onondaga Lake Superfund subsites, a few temporary solutions, known as Interim Remedial Measures (IRMs), have been carried out. For example, a cap of concrete-like material was placed on the Semet tar beds to help eliminate foul odors. Also, a series of interceptor wells was installed on the lake-side of Interstate 690 to prevent a plume of chlorobenzenes from reaching the lake from Allied-Signal's Willis Avenue site.

Nearly every site is still in some stage of investigation or feasibility study. The final document which describes the course of action to be taken is called the Record of Decision, or ROD. The schedule for the RODs (see Table 2) has already been subject to numerous delays, and for many of the subsites no deadline has been established.□

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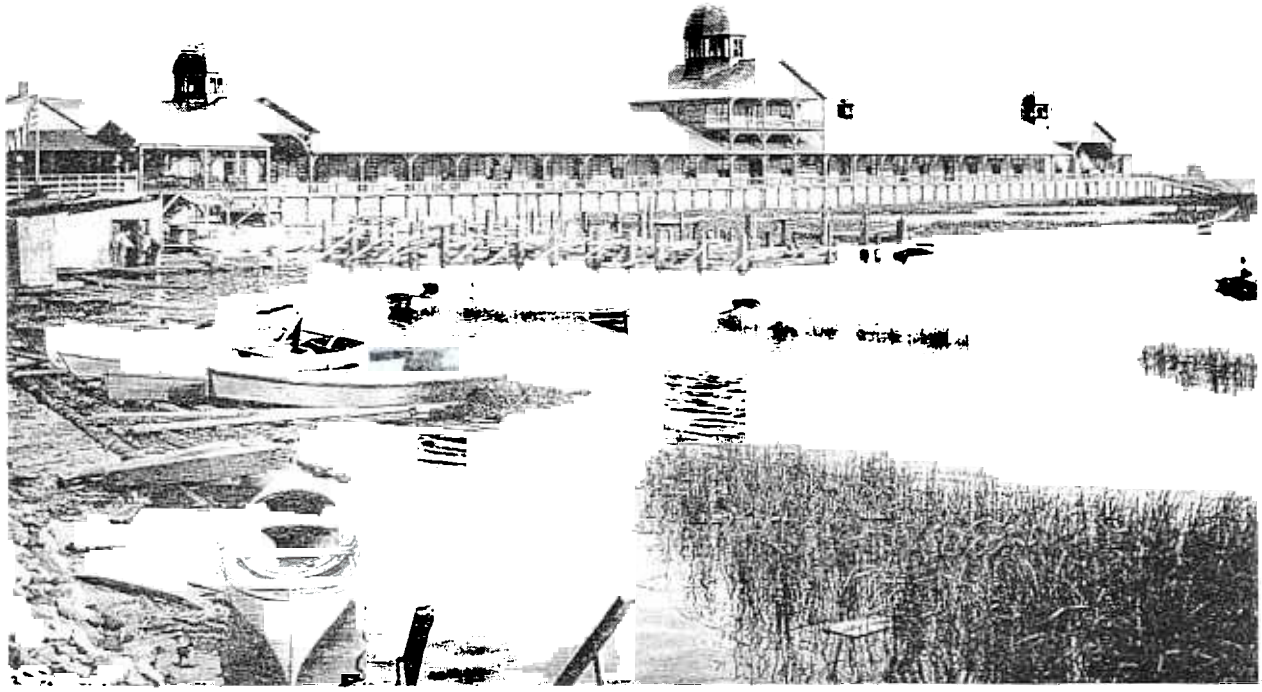
TABLE 2. TENTATIVE SCHEDULE FOR RECORDS OF DECISION

SUBSITE	RECORD OF DECISION EXPECTED*
Ley Creek dredge spoils	ROD approved; preliminary design to be completed by Fall 1998
Bridge St. Chlor-alkali plant (LCP)	early 1999
Willis Ave. site	mid-1999
Lake sediments	June 2000
Semet Tar Beds	unknown
General Motors Fisher Guide plant	unknown
Maestri 2 site	unknown
Salina Town landfill	unknown

**Source: New York State Department of Environmental Conservation*



The Iron Pier at the southern end of Onondaga Lake. The lake was home to a thriving resort industry around the turn of the century.

MUNICIPAL POLLUTION

(contd. from page 3)

disposal of human wastes, replacing them with sewers which conveyed untreated sewage to local tributaries, and thence to the lake. This was intended to protect public health, but was disastrous for the environment. As the population of Syracuse increased, pollution of the lake became ever more pronounced.

In 1901, ice harvesting was prohibited for health reasons. The city made efforts in the 1920's to limit municipal pollution by installing interceptor sewers and constructing a primary treatment plant (see Box 1) to handle most of Syracuse's municipal wastes. Nonetheless, the health of the lake did not improve much. In 1940, swimming was banned, also for health reasons. By the 1950's, water quality in the lake reached a new low, and "mats of sewage" were sighted floating around in the lake. Local civic leaders eventually responded by establishing a consolidated Metropolitan Sewer District responsible for reducing pollution to the lake. In 1960, a new primary sewage treatment facility, the Metropolitan Sewage Treatment Plant (Metro), was constructed at the south end of the lake. The original plans called for the construction of a pipeline to the Seneca River, due to the limited capacity of the lake to handle sewage, even after treatment. Unfortunately, this pipeline was never constructed, due to both financial and political reasons.

In the early 1970's plans were made to substantially upgrade and expand the county's Metro plant. Public pressure --particularly through the Sierra Club-- forced the county to prepare an Environmental Impact Statement. During the required public comment period, numerous parties recommended that the plant be relocated to the Seneca River. Nevertheless, the county elected to keep the plant at its present location. In 1978, Metro was upgraded to include secondary treatment; tertiary treatment was added in 1981. These

steps, together with the Great Lakes states' ban on high-phosphate detergents in 1972, reduced the input of pollutants-- particularly phosphorus--into the lake.

Since the mid-1980's, however, water quality in the lake has not changed much. The lake is still plagued by high levels of ammonia and phosphorus, discharged primarily by Metro, and by bacterial contamination from combined sewer overflows, or CSOs (see Boxes 2 & 3). In addition to adversely impacting the lake ecosystem, these conditions limit the lake's potential as a recreational resource. In 1988, Atlantic States Legal Foundation sued Onondaga County for wastewater permit violations in an effort to bring about a remedy to these problems. New York State joined the suit against the county, and a three-way settlement (Consent Judgment) was reached in January of 1989.

1. Sewage Treatment Basics

Sewage treatment consists of a sequence of steps:

Primary treatment is a simple process in which wastewater passes through settling tanks, thereby removing solid particles.

Secondary treatment removes both particles and dissolved pollutants using micro-organisms which feed on the waste.

Tertiary or advanced treatment is anything beyond secondary treatment. In the case of the Metro plant, the tertiary step consists of some settling tanks used to remove a limited amount of phosphorus. When the plant is upgraded, tertiary treatment will consist of a biological system used to remove ammonia, followed by filtration to remove additional phosphorus.

The settlement called for the creation of a set of computerized water quality models to be used in predicting the effects of reducing pollutant inputs to the lake. These were completed and finally approved in 1993. The state was then to use the models to evaluate competing alternatives offered by the county. Unfortunately, the county offered a series of questionable plans, none of which would achieve compliance with regulatory standards. After a long series of regulatory delays, legal actions, and numerous negotiating meetings, a settlement was reached in August of 1997. This settlement, known as the Amended Consent Judgment, or ACJ, went into effect on January 20, 1998.

The ACJ calls for a series of construction projects designed to address the problems caused by Metro and the combined sewer overflows (see Table 3). These projects are stretched over a 15-year schedule, with final compliance put off until the end of 2012. However, building a larger, more expensive treatment facility is no guarantee of a clean, usable lake.

There remains considerable skepticism, both on the part of ASLF and the scientific/ engineering community, about the county's ability to meet the stringent limits contained in the ACJ. For example, the ACJ sets a target phosphorus concentration of 20 micrograms per liter for lake water. Even if maximum achievable reductions in phosphorus from urban and agricultural runoff (which enter the lake principally via its tributaries) is achieved, it is unlikely that this goal will be met with the technologies to be employed at Metro. The alternative would be to divert Metro's discharge to the Seneca River (the Lake's natural outlet), thus eliminating the largest source of phosphorus to the lake. This option has a much greater chance of meeting this water quality standard.

To divert or not to divert?

Should treated sewage from Metro be diverted from the lake by means of a pipeline to the Seneca River (as originally planned in 1960)? The 1989 Consent Judgment requires the county to evaluate the Seneca River dis-

2. *Principal Pollutants from Municipal Waste*

Phosphorus is a nutrient key to plant growth. For this reason, many agricultural fertilizers are rich in phosphates. In normal lake environments, naturally occurring phosphates nourish algae, which, in turn, provide sustenance for a variety of life forms, including many species of fish. However, when unnaturally large quantities of phosphates are loaded into an ecosystem, its delicate equilibrium is disturbed. The extra phosphorus causes algal blooms, which make lake water turbid and murky. Since turbidity is one of the two criteria used to determine whether a water body is swimmable (coliform bacteria count is the other), excessive phosphorus loading directly limits the activities permitted on Onondaga Lake. Furthermore, when the algae die and decompose, they consume large quantities of dissolved oxygen that fish and other aquatic life need to breathe. Such a situation can produce the perception that a water body is "dead." The Metro plant and the CSOs together contribute about 70% of the phosphorus entering the lake.

Ammonia contains nitrogen, also a nutrient that promotes plant (i.e. algae) growth. However, at the high concentrations frequently found in Onondaga Lake, ammonia is toxic to a wide range of aquatic life forms. Metro is the source of over 90% of the ammonia entering Onondaga Lake.

Coliform bacteria are found in the digestive tracts of all mammals, and, as a result, are present in their fecal matter. Sewage reaching the lake via CSOs contains high concentrations of these bacteria because it is not treated. This is not only disgusting, but it poses a health hazard to persons coming into contact with lake waters after storm events (i.e. when CSOs discharge untreated sewage to lake tributaries).

charge alternative, due to the extremely limited capacity of the lake to assimilate pollutants (especially phosphorus). Although the ACJ favors an in-lake discharge, it contains provisions for diversion in the event that the county cannot meet water quality standards with additional treatment technology. Opponents of diversion argue that the Seneca River should not be a receptacle for Syracuse's wastes. They also point to the river's burgeoning population of zebra mussels which reduce oxygen levels in the river water during the summer months. The presence of the zebra mussels drastically reduces the capacity of the river to assimilate the Metro effluent.

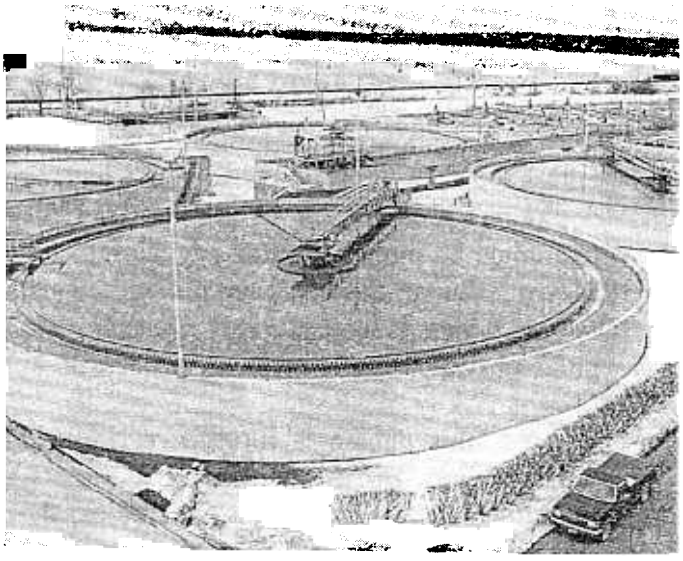
Proponents of diversion note that an in-lake discharge cannot possibly meet water quality standards without relying on unproven and/or very expensive treatment technologies. They also point out that much of the pollution from Metro simply passes through the lake and enters the river anyway. Finally, the oxygen depletion problem in the river can be overcome by pumping extra oxygen into the Metro effluent before it is discharged--an option which is considerably cheaper than building expensive treatment processes at Metro.

How this debate is ultimately resolved will depend on a number of factors, including the results of various studies, the success of a number of pilot projects, and, most importantly, public opinion. □

*TABLE 3. PRINCIPAL AMENDED CONSENT JUDGEMENT PROJECTS.**

PROJECT	DUE DATE	PURPOSE
METRO UPGRADES	2002	Undertake deferred maintenance
AMMONIA REMOVAL AT METRO (Biological filters)	2004	Reduce ammonia discharged by Metro to lake (Currently Metro accounts for over 90% of ammonia entering the lake).
PHOSPHORUS REMOVAL AT METRO-PHASE I (Sand Filters)	2006	Reduce phosphorus discharged by Metro to lake (Currently Metro accounts for over 60% of phosphorus entering the lake).
PHOSPHORUS REMOVAL AT METRO-PHASE 2 (Dual Filters)	2012	Further reduce phosphorus discharged by Metro.
CSO ABATEMENT	2012	Reduce size and number of overflows; disinfect remaining CSO discharges

** Additional activities include: an environmental benefits project on control of non-point sources; lake oxygenation demonstration; nitrification pilot study; dual filtration pilot study; and ammonia reduction program.*



Settling tanks at the Metro Sewage Treatment Plant.

3. CSOs

Combined Sewer Overflows, or CSOs, are a kind of relief valve in the sewer system. When it rains, runoff from city streets combines with ordinary sewage and frequently exceeds the capacity of the sewer pipes leading to the sewage treatment plant. In order to prevent the sewers from backing up into homes and onto streets during storm events, engineers designed the system so that excess water overflows into a local creek. There are some 45 CSOs along Onondaga Creek within the City of Syracuse, an additional 19 along Harbor Brook, and two on Ley Creek. Discharges of raw sewage occur an average of 50-60 times per year.

Where Can I Find More Information?

Additional information about the Onondaga Lake Superfund Site can be found at three local repositories. Collections include clean up plans, scientific studies of the lake and the subsites, and reports on contaminations in the lake.

Atlantic States Legal Foundation
658 West Onondaga Street
Syracuse, NY 13204
(315) 475-1170
Hours: M-F 8:00 a.m.- 6:00 p.m.
Please call first.

Onondaga County Central Library
Fifth Floor, The Galleries
447 South Salina Street
Syracuse, NY 13204
(315) 435-1900
Hours: M, Th, F and Sat, 9:00 a.m.- 4:50 p.m.
Tu and Wed, 9:00 a.m. to 8:20 p.m.

NYSDEC Region 7 Office
615 Erie Boulevard West, 2nd Floor
Syracuse NY 13204
(315) 426-7400
Hours: M-F, 8:30 a.m. - 4:45 p.m.

SUPERFUND NEWSLETTER TOPICS

No.	Main topic
	Overview of the Superfund program *(Feb. 1997)*
2	Industrial Contamination vs. Municipal Pollution *(this issue)*
3	Contamination in Lake Sediments*
4	Risk Analysis*
5	Public Participation*

* *Forthcoming*

If you would like to receive any of the newsletters in this series or have any questions about the contents of this newsletter, please call Atlantic States Legal Foundation at 475-1170, or send e-mail to aslf@igc.apc.org.

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Onondaga Lake Quiz

1. What city/cities lie in the Oswego River drainage basin?

A. Fulton	C. Rochester	E. Utica
B. Rome	D. Syracuse	F. Auburn

2. Into which body/bodies of water does water from Onondaga Lake flow?

A. Onondaga Creek	C. Oneida Lake	E. Lake Ontario
B. Seneca River	D. Oswego River	F. Harbor Brook

ANSWERS
Question 1 = ABDF Question 2 = BDE

Support Atlantic States' Efforts to Promote a Safer, Cleaner Environment for Everyone

Atlantic States Legal Foundation was established in 1982 to provide legal, technical, and organizational assistance on environmental issues to non-governmental organizations and others. ASLF's work in Central New York includes three program area: (1) the *Oswego River Basin Program*, which includes a variety of initiatives on Onondaga Lake, the Finger Lakes, and the Seneca, Oneida, and Oswego Rivers; (2) *Community Education*, including Onondaga Creek restoration and workshops on environmental health issues; (3) *Environmental Justice* for all citizens adversely impacted by environmental degradation.

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